fragments of quartz, felspar, calcareous spar, a brownish-yellow mica, and particles of attractable oxide of iron.

The paper closes with some account of corundum, which, contrary to the received opinion, that this stone was only found in the East Indies, has been thought to exist in other parts of the world. The author dwells mostly upon the appearances of a stone he himself discovered in the mountainous parts of the Forez in France, and which the Abbé Hauy considers only as a species of felspar. The Count alleges his reasons for classing it with the perfect blue corundum, known by the name of Sapphire. As to various stones found in Germany, in the Isle of Tirree on the western coast of Scotland, on Chesnut-hill near Philadelphia, and elsewhere, which have by some been considered as corundum, the author cautions us against acquiescing in those assertions till more conclusive arguments shall appear in their favour.

*Analysis of Corundum, and of some of the Substances which accompany it; with Observations on the Affinities which the Earths have been supposed to have for each other, in the humid Way.* *By* Richard Chenevix, *Esq. F.R.S. and M.R.I.A.* Read May 20, 1802. [*Phil. Trans.* 1802, *p.* 327.]

After a detail of several unsuccessful attempts to analyse this stone, which on account of its great hardness is both difficult to pulverize and to be reduced by saline agents, we find an ample description of the process, which was attended with the desired success. A piece of corundum, weighing 100 grains, was made several times red hot, and plunged into cold water; it was then pounded, first in a steel, and next in an agate mortar, and thus reduced into an impalpable powder. This powder was by means of dilute muriatic acid cleared from the ferruginous particles which adhered to it from the steel mortar. It was then put into a platina crucible with 200 grains of sub-borate of soda, and the mixture was exposed for an hour or two to a violent heat: the glass produced by this fusion was in about twelve hours dissolved, by boiling it in a proper quantity of muriatic acid.

The silica might now have been separated by evaporating the whole to dryness, but it was thought preferable to get rid of all the salts contained in the liquor by a precipitation effected by means of an alkaline carbonate. The precipitate thus obtained was then redissolved in muriatic acid, and the silica was hence cleared by evaporation. The remaining liquor was afterwards boiled with potash, by which means the alumina was precipitated. It was then redissolved by the excess of potash, from which the earth was finally obtained by muriate of ammonia. A small proportion of iron was separated by muriatic acid. Both these earths being now washed and dried, were ignited, and thus the exact weight of each was accurately ascertained. The author paid particular attention to the silica produced in this process; as Mr. Klaproth, who had formerly analysed this stone, declares that he never found any of this ingredient.

Next follow the tables of the contents of six kinds of corundum, viz. the sapphire, the ruby, and the corundum from the Carnatic, from Malabar, from China, and from Ava. The proportions of the first species are $5\frac{1}{4}$ silica, 92 alumina, 1 iron, and $1\frac{3}{4}$ loss. The proportions of the other kinds do not differ very considerably from these.

The matrices of these stones being more easily fused than the six kinds above mentioned, the usual and well known mode of treatment by potash was found sufficient to render them soluble in acids. Although this mode be now very familiar to chemists, the author, however, in order to leave no cause for suspicion, describes the process he used with the matrix of the corundum from the peninsula of India. The results gave $42\frac{1}{2}$ silica, $37\frac{1}{2}$ alumina, 15 lime, 3 iron, and 2 loss, with a trace of manganese. By similar treatment the various substances contained in this and some other matrices, viz. felspar, fibrolite, and three sorts of thallite, were analysed, and the results are given in tables. It is remarkable that while all the other substances yield in different proportions the same ingredients as the matrices themselves, the fibrolite was found to consist only of silica and alumina, the quantity of iron it contained being so small as hardly to deserve notice.

In the prosecution of this inquiry Mr. Chenevix observed, that if a quantity of potash be for some time kept in fusion in a platina crucible, the latter will be found to lose some grains of its weight. The quantity of the metal thus lost he actually found in the potash; and hence he infers the affinity between these two substances, which affinity, it seems, is made use of by the Spaniards for detecting the platina contained in the ingots of gold sent from their American possessions. He also has occasion to show that potash which has usually been denominated a fixed alkali is not so, strictly speaking, since there is a degree of heat by which it may be totally volatilized.

In a second part of the paper the author treats of the affinities which the earths are supposed to exercise towards each other when held in solution by acid or alkaline menstrua. There being a difference of opinion on this subject among some of the most eminent chemists, Mr. Chenevix has repeated many of their experiments, especially those of Guyton de Morveau. After descanting largely on the probable causes of error in this eminent chemist, as well as in Mr. Kirwan and others, he derives from his results the following general conclusions.

1st. That there exists an affinity between silica and alumina.

2ndly. That there exists a very powerful affinity between alumina and magnesia.

3rdly. That alumina shows an affinity for lime.

4thly. That Mr. Guyton was mistaken in every instance of affinity between the earths, except in one which had been observed before his experiments; and that he has attributed to a cause which does not exist, phænomena that must have resulted from the impurity of his re-agents.

And lastly, That neither the experiments of Mr. Guyton, nor an

opinion maintained in an anonymous letter from Freyberg, published in the 4th volume of Mr. Nicholson's Journal, are sufficient to diminish in any degree the value of that assistance which mineralogy derives from chemical investigation.

*Description of the Anatomy of the* Ornithorhynchus Hystrix. *By* Everard Home, *Esq. F.R.S.* Read June 3, 1802. [*Phil. Trans.* 1802, *p.* 348.]

The specimen from which this description was taken, and which was exhibited to the Society at their Meeting, was brought from New South Wales. It is a male, probably arrived at its full growth. It is seventeen inches in length from the point of the bill to the extremity of the tail; and its greatest circumference measures likewise about seventeen inches. Its back and sides are covered with quills, the longest of which are about two inches and a half in length. Its bill projects from the head one inch and three-fourths, tapering from its base, where it is seven-eighths of an inch in diameter to its point, where its diameter is not above three-eighths of an inch. It is tubular, convex on the upper, and flat on the lower surface. The tongue is cylindrical, very small towards the point, and eight inches long. This species has a peculiarity in its mode of managing its food, which distinguishes it from the Paradoxus. The food is first bruised by small horny prominences adhering to the tongue and palate, and then swallowed with a certain quantity of sand, the stomach being sufficiently large to contain this extraneous matter, together with the food, and effectually defended from injury by a cuticular lining.

Mr. Home proceeds, with his usual accuracy and minuteness, in his technical description, both of the external and internal parts, which he illustrates with a number of figures. Having completed this detail, he observes in general, that this species of Ornithorhynchus being a nearer approach to the more perfect quadruped than the Paradoxus, and its tongue being in some respects similar to those of the Manis and Myrmecophaga, he thought it necessary to look among the different species of these genera for other parts of resemblance. The result of this comparison is, that the Ornithorhynchus is essentially different from all other quadrupeds, bearing in some respects a resemblance to birds, and in others to the Amphibia, so that it may be considered as an intermediate link between the classes Mammalia, Aves, and Amphibia. To the first class it no doubt approaches nearest in the instance of the Myrmecophaga; and to the birds it bears a singular affinity in the male organs of generation, as is here illustrated by comparing its penis with that of the drake.

From the whole of this investigation are deduced the following characters as peculiar to this animal, considered as a genus. The male has a spur on the two hind legs, close to the heel. The female has no nipples, differing essentially in this, as well as in the organs of generation, from the Mammalia. The beak is smooth, while the rest of the animal is covered with hair. The tongue has horny pro-